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ABSTRACT

The newsletter presents six articles and associated information concerned with assistive technology for children and youth with handicaps. "Technology: Becoming an Informed Consumer" (Elizabeth Lahm and Sue Elting) reviews the history of technology with emphasis on assistive technology, offers case studies on technology applications, and gives guidelines for making informal choices when purchasing home computer software and selecting assistive technology equipment. "Assistive Technology: A Parent's Perspective" (Julie Fleisch) notes problems parents have in keeping up with available technology and financing needed technology. "Federal Legislation and Assistive Technology" (Roxanne Rice) summarizes provisions and requirements pertaining to assistive technology under six federal laws. "Effective Use of Technology with Young Children" (Mary L. Wilds) notes skills needed for interactive use of computers, selection of battery-operated toys and switches, and introducing young children to computers. "Integrating Technology into a Student's IEP" (Ruth Bragman) reviews technology in the context of students' individualized education programs (IEPs), discussing hardware adaptations, student assessment/evaluation considerations, traditional and technological considerations, and selection of devices and software and identification of their operational characteristics. "Starting the Funding Process" (Suzanne Ripley) offers families suggestions for acquiring funding for assistive technology. A listing of information sources includes 18 books, reports, and magazine articles; 19 magazines and newsletters; and 29 organizations. (DB)

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ASSISTIVE TECHNOLOGY

NUMBER 13 1989

NICHCY News Digest

National Information Center for Children and Youth with Handicaps
Washington, DC

Technology: *Becoming an Informed Consumer*

The Center for Special Education Technology, The Council for Exceptional Children, Reston, Virginia.

by Elizabeth Lahm and Sue Elting

Today, a nonverbal child speaks with the help of an electronic communication aid. A student with learning disabilities masters math facts using a computer game. A child with vision problems can benefit from an inexpensive device that enlarges printed words on the computer screen. And for more severe vision problems, there are speech synthesizers that can be used with computers to convert typewritten words or text into an electronic voice.

For the child who has a physical disability, there are special devices that will allow him or her to input information into the computer without using the conventional keyboard. This can be done through the use of a single switch or some type of voice recognition system. There are other alternative input devices that can be used simply by touching the computer screen or touching points on a touch-sensitive tablet that correspond to the points on the computer screen.

Computer and other technologies have expanded and enriched lives and given many children with disabilities options not imagined a decade ago. As there is a wide array of assistive technology, so too are there many decisions, choices and options for families and professionals. Making informed decisions about technology is a challenge that many consumers will encounter in coming years. Resources are available to assist consumers such as: current periodicals; disability, parent, and professional organizations; national technology centers; and private companies. Walking the assistive technology maze can be made less complex and confusing by understanding the implications of technology in the lives of children and youth with disabilities, and by knowing where to go for help.

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Assistive Technology: *A Parent's Perspective*

by Julie Fleisch, Seattle, Washington

Last year my son, Colin, lost a tooth at school as the speech therapist was feeding him his lunch. She told him he should take it home and put it under his pillow for the tooth fairy. The conversation continued with the therapist asking Colin about the tooth fairy. "Does the tooth fairy come to your house?" Colin pointed to YES on his wheelchair tray. "Does the tooth fairy come to visit your sister?" YES. "Has the tooth fairy ever come to see you?" NO. When the speech therapist related this conversation to me, I felt so neglectful. I know my son so well yet I had assumed he didn't understand the whole tooth fairy concept. Colin has surprised me many times with his understanding and observations of his world; a world he has trouble interacting with.

His world is a little different than the one most children live in. Colin has cerebral palsy. He is unable to walk yet gets around on his knees, in his wheelchair, and on an adapted tricycle. He is also nonverbal and relies on an alphabet board–both manual and programmed varieties–to spell out messages. Through his spelling boards we are slowly unlocking some doors for him. He has so many limitations yet so many abilities, the conflict between the two being the biggest challenge for those who work with him. How do we deal with the limitations so that the abilities can be used?

When Colin was born nine years ago, my husband and I had no idea how complicated our life was to become. Our resources have been stretched and our plans altered drastically. We started adapting things and purchasing special equipment for him when he was very young. Because we fall in an economic bracket that does not allow us financial assistance for Colin, we have learned to be very creative. I carry an Allen wrench in my purse and can do almost anything with velcro. There have been a long list of needs and a variety of ways we have tried to meet those needs. Our experiences have brought forth, for me, some major areas of concern for families who have children, like Colin, with high needs for assistive devices and technology. Where do families find the financial resources to meet their child's needs? Who do parents go to for help? And how

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Becoming an Informed Consumer

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Then and Now

In the late 1800s, the population of the U.S. was growing rapidly. Census information, gathered by hand, resulted in long delays and inaccuracy in the information reported about the nation's population. In fact, the 1880 census took eight years to count. Estimates at that time indicated that if the census process continued in the same manner, the 1890 census would take twelve years to complete and the 1930 census would be available in 1985.

Help arrived in the form of the 1890 Census Machine developed by John Shaw Billings and Herman Hollerith. The 1890 census took three years to complete and computerization was underway. Hollerith turned to big business to market the invention, now called the Tabulating Machine. He joined a company that eventually called itself International Business Machines (IBM). IBM joined with Harvard in 1938 to create the first electronic computer, the Mark I. The Mark I required 46,000 vacuum tubes to perform its operations.

The ENIAC computer, completed in 1947, weighed 30 tons, stood nine feet tall, and took up 1,500 square feet. In 1951 the UNIVAC computer was completed. Weighing in at a mere 3 tons and occupying only 575 square feet, UNIVAC was the first computer to handle numbers and words. Commercially produced computers continued to evolve, with more power packed into less space at a lower price.

In 1973, the first computer chip, the 8080, was manufactured by Intel. Less than a square inch in area and thin as cardboard, this chip can perform a million calculations per second (like the ENIAC) but only costs about $4 to purchase. These chips are inexpensive because their main ingredient is silicon, which is more common than sand, and they are produced in enormous quantities (Budoff, Thormann, and Gras, 1985).

Computers were the beginning of the new information technology. Information (facts, knowledge, data, and news) technology (materials, tools, systems and techniques) is the key to economic growth. It is likely to bring about substantial changes in society and may change lives–for better or worse–in a very short time. It will improve the quality of life for many people by making information more accessible and providing more information at a low cost which will increase opportunities for all. The greatest gain will be to the educationally disadvantaged, among them, students with disabilities (Hawkridge, Vincent, and Hales, 1985).

The interest in using computer technology with people with disabilities began in October 1981 with the Johns Hopkins First National Search for Applications of Personal Computing to Aid the Handicapped. In November 1980, the Applied Physics Laboratory at The Johns Hopkins University began a national search for applications of personal computing to aid the handicapped. Enthusiastic responses from professionals, amateurs, and students resulted in introductory workshops and regional fairs, and culminated in an exhibit of the top national entries at the National Academy of Sciences, an awards ceremony in Washington, D.C., and a two-day workshop on computing for the handicapped at Johns Hopkins in October 1981.

In March 1983, The Council for Exceptional Children held its First National Conference on the Use of Microcomputers in Education. This conference reflected the need for basic workshops on microcomputer use and for information on practical applications of computers in special education. In 1983 CEC/ERIC published: *Microcomputers in Special Education* by Florence M. Tabor; *The Exceptional Parent* magazine published its first annual technology issue; and the IEEE held its first Computer Society Workshop on Computers in the Education and Employment of the Handicapped.

1984 saw the first U.S. Office of Special Education Programs (OSEP) document published by COSMOS Corporation: *Microcomputer Implementation in Schools* by Robert K. Yin and J. Lunne White. The document described and analyzed the use of microcomputers in the schools and district offices of 12 school districts. In September, 1984, Closing The Gap held its first conference on Computer Technology for the Handicapped. A 1985 OSEP publication, *Robotics, Artificial Intelligence, Computer Simulation: Future Applications in Special Education*, by Gwendolyn B. Moore, Robert K. Yin, and Elizabeth A. Lahm, identified ways in which technologies might be used to help special education students in the future.

The vehicle for introducing technological devices for educational use was put into place in 1975 with the passage of the Education of the Handicapped Act (EHA), P.L.94-142. Increased federal interest was demonstrated with the passage of the Amendments to the Education of the Handicapped Act of 1986, P.L. 99-457. These amendments created a new Part G designed to promote the use of new technology, media, and materials in the education of students with disabilities. Discretionary grants under this new authority were targeted to:

- assess usage and promote effectiveness;
- design and adapt new technology, media, and materials;
- assist public and private sectors in development and marketing; and
- disseminate information.

More recently, the *Technology-Related Assistance for Individuals with Disabilities Act of 1988*, P.L. 100-407, was signed into law. The primary purpose of the act is to assist states in developing and implementing statewide programs of technology-related assistance for meeting the needs of individuals with disabilities. The program will enable individuals with disabilities to acquire assistive technology devices and services. Over a three year period, all states will have the opportunity to get federal assistance for developing and establishing their statewide program.

The legislation refers to technology-related assistance and allows each state to decide what is meant by technology-related assistance. The term does include, however, two separate components: services and devices.

Assistive devices are not a new area of interest created by the new law. As shown above, interest in the new higher technologies began shortly after the silicon chip invention. Prior to that, low technology assistive devices were being developed and used for centuries. Consequently, definitions of what an assistive device is are numerous, and are often based on the perspective of a specific agency or disability group.

The wide variety of assistive devices,

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and their applications to children and youth with disabilities, is currently receiving a great deal of attention from many disability-related fields. This flurry of activity stems from the potential that new and emerging technologies hold for individuals with disabilities to lead full and independent lives. The cases below provide only a few examples of the versatility and application of technology and their benefits.

Technology Applications

Case 1: A high school student with a visual impairment in a Current Events class has an assignment to follow a recent major event, present available facts about it, write a report, and complete a presentation about the event to his classmates. A major source of information for his sighted classmates is the newspaper, but unless someone reads it to him, he cannot use that source. The radio is an available option, but typically radio news coverage contains too little detail. With the available computer technologies, though, he can receive the newspaper on a computer disk and, using his personal computer equipped with synthesized speech, he can auditorily scan the newspaper, find relevant articles, and have the computer read them to him. Using the same computer, he can begin to write his paper, print it out in braille so he can check it and change it if necessary, and then print it in standard text to hand into his teacher.

Case 2: An adolescent with quadraparalysis shows all the signs of becoming a teenager. She wants control of her own life: to decide which radio station to listen to, to decide when to turn the reading light off at night, to call her friends and have a private conversation, and to stay home alone when her parents go out. Without assistive devices she would be unable to be an independent teenager, but with a single switch connected to an environmental control unit and placed on her head, she can control her personal radio, turn the lights on and off, access the telephone for calling friends, and call for emergency help when her parents are out.

Case 3: A toddler with severe disabilities attends a special education preschool program. The teachers are unable to determine the child's cognitive abilities because the child has no verbal skills and very few motor skills. In the past, teachers had few ideas for appropriate educational programs for this type of child. As a result of available technologies, the child's educational program includes motor training, language and communication training, and teachers can more easily see the child's potential and can build on it. Now the teachers are working on training him to use a consistent motor response using switches and battery-operated toys. The child is learning to reach and touch a switch which turns on a battery-operated teddy bear. Other times the child has two or three switches to choose from and must decide which toy is preferable. The language therapist is using the same switches to teach the child to make consistent "yes" and "no" responses for communication.

FROM NICHCY's DIRECTOR...

Raising a child with a disability presents families and professionals with many challenges. Today, one of the major challenges facing people who care for and about children and youth with disabilities is technology–what to get, where to get it, how to use it, how to pay for it, how to evaluate its effectiveness, and where to put it. Technology is receiving the attention of families, advocates, legislators, and professionals due to its potential for enhancing the lives of individuals with disabilities. From computers to communication devices to environmental controls, the world of technology offers many children and adolescents with disabilities the tools necessary to be more successful in school, at work, and at achieving independence in daily living. Indeed, opportunities unthought of ten years ago are now becoming available to some children with disabilities with the assistance of new technology, and rumors of emerging technology are raising new hopes.

Yet, the diversity of available technology, its ever changing nature, the lack of general sophistication regarding it, and the decisions to be made prior to purchase, prompt many and continuous questions. During the time this *NEWS DIGEST* was being developed, the staff of the National Information Center for Children and Youth with Handicaps *(NICHCY)* found that much information does exist on all issues related to the choice and purchase of any piece of technology; much of the information is, however, of varying degrees of readability, in many and disparate places, and often requires the skills of a super sleuth to uncover or decode.

With all of this in mind, and after much deliberation, we at *NICHCY* decided that the best way to serve you, our readers, was to develop a *NEWS DIGEST* on some of the most important issues about assistive technology identified from your questions to *NICHCY* over the last 18 months. In truth, the articles presented are intended only to help you begin your journey through the "technology maze." Resources are included to assist you as you continue your journey.

Thus, from stacks of information, we have herein presented selected accounts. This information is the most basic and least changeable. We sincerely hope the information in this issue is helpful to you. Please let us know.

Computers for Home Use

Many of the computers purchased each year are bought for use in the home. Well over 50% of home computer owners report that the major reason for buying a computer is for educational applications. Exactly how computers are used depends on the software selected. Depending on the design and content, software can present new skills or concepts, reinforce previously learned skills, or require the learner to apply skills to a task or problem. Educational software generally falls into four categories: drill and practice, tutorial, simulations, and games. Tool software such as word processing are another option. Each type of software can be used for instruction at home.

Drill and Practice. These programs provide opportunities for the child to practice previously learned skills. The content of the drill and practice program is usually structured, focusing on a specific sequence or kind of skill-building. For many students with disabilities, drill and practice activities are very important for mastering skills, and using this kind of software at home can reinforce learning that takes place at school.

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Federal Legislation and Assistive Technology

by Roxanne Rice, J.D.,
National Information Center for Children and Youth with Handicaps (NICHCY), Washington, DC

The legislation discussed below outlines the federal government's recognition "... that for all individuals, technology can provide important tools for making the performance of tasks quicker and easier, but for some individuals with disabilities, assistive technology is a necessity that enables them to engage in or perform many tasks." (*OSERS NEWS In Print*, 2(1) 1989). For more information about any any of these laws, contact your State Education Agency, State Developmental Disability Council, State Protection and Advocacy Agency, parent or disability group, or write to *NICHCY*. In addition, single copies of these laws may be obtained, usually for about $1, by writing to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Telephone 202/783-3238). Information may also be available by contacting your Congressional Representative.

I. 1986 Amendments to the Rehabilitation Act (P.L. 99-506)

Title I of the Rehabilitation Act authorizes over one billion dollars to the states to provide rehabilitation services including evaluation, counseling, training, placement and rehabilitative technology services to individuals who qualify for vocational rehabilitation services.

The 1986 Amendments require that states receiving funds available under this Act must "describe how rehabilitation engineering services will be provided to assist an increasing number of individuals with handicaps."

The Amendments also include a definition of rehabilitation technology services as "the systematic application of technology, engineering methodologies, or scientific principles to meet needs of individuals with handicaps in areas which include education, rehabilitation, employment, transportation, independent living, and recreation."

The law requires that in assessing an individual's potential for rehabilitation services, rehabilitation engineering services should be explored. In addition, part of the Individual Written Rehabilitation Plan (IWRP) should include, where appropriate, a statement on the benefits of rehabilitation technology services for the individual's rehabilitation goals.

II. Developmental Disabilities Assistance and Bill of Rights Act Amendments of 1987 (P.L. 100-146)

The Developmental Disabilities Assistance and Bill of Rights Act requires that all funded services be aimed at providing opportunities and assistance for persons with developmental disabilities to allow them to "achieve their maximum potential through increased independence, productivity and integration into the community."

The 1987 Amendments require that each state submit an annual report including descriptions of the currently unavailable assistive technology services which could be of benefit to persons with developmental disabilities.

Funds authorized under this Act may be used for planning, advocacy, systems change, and direct services. These direct services may include assistive technology services.

III. Education of the Handicapped Act (P.L. 94-142) and the 1986 Amendments to the Act (P.L. 99-457)

The Education of the Handicapped Act (EHA) requires that states provide a free, appropriate, public education, including related services, for all children with disabilities from ages 5 to 21. The 1986 Amendments to the Act require that states provide special education and related services to children from 3 to 5 years of age no later than the 1991 school year, and establishes a new, voluntary state grant program for providing early intervention services for infants and toddlers with disabilities (ages birth to 2 years).

The law requires that each child receiving special education and related services must have an Individualized Education Program (IEP) or an Individualized Family Services Plan (IFSP, for children birth to ages two), designed to meet their uinique needs. The IEP or IFSP should reflect the assistive technology needs of the child.

Part G of the Act authorizes the Secretary of Education to make grants or enter into agreements with appropriate institutions to advance the use of new technologies, media and materials used in educating students with disabilities.

States differ on the issue of providing assistive technology under the Act. Some states do provide technology-related assistance as part of related services, while other states have made no such provisions.

IV. Elementary and Secondary School Improvement Act of 1987 (P.L. 100-297)

This Act is a consolidation of legislation on programs for elementary and secondary education. A number of the amendments are designed to conform the Act more closely with the Education of the Handicapped Act. This includes the P.L. 99-457 requirement for early intervention services to children between birth and age 2.

The Act allows states to use authorized funds for programs which may include the acquisition of equipment and instructional materials. Funds may additionally be used for training in the use of assistive devices and other specialized equipment.

V. Social Security Act, Budget Reconciliation Act of 1986 (P.L. 99-509)

A. Medicaid. Medicaid funds provide medical services to qualifying individuals. States are required to provide certain basic

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medical services but can elect to cover other services as well.

Assistive technology devices are covered only if they fit into the Medicaid definition of a prosthetic device. Prosthetic devices are defined as replacement, corrective, or supportive devices prescribed by a physician or other licensed practitioner. Additional covered services include "other diagnostic, screening, preventive and rehabilitative services." This language might be seen as including assistive technology devices and services. States differ greatly in what they will cover in this area. Some states allow Medicaid funds to be used for augmentative communication devices. Other states will not allow funds to be used for equipment they do not consider to be a prosthetic device.

Individuals in active treatment in an Intermediate Care Facility for the Mentally Retarded and other related conditions may be eligible for assistive technology services under Medicaid regulations. Active treatment could include mechanical supports to achieve proper positioning, toilet and bathing facilities, communication aids, and other devices.

B. Maternal and Child Health Services Block Grant (Title V). Maternal and Child Health Services funds may be used by each state for its own priorities. Many services may be funded including: early identification and intervention services, diagnostic and evaluation services, family support services and "medical, surgical, and corrective services." Some states are currently using Maternal and Child Health Services funds for adaptive equipment and assistive devices including wheelchairs for children with disabilities.

VI. Technology-Related Assistance for Individuals with Disabilities Act of 1988 (P.L. 100-407)

Citing the inadequacies of available access, trained personnel, and financing in the area of assistive technology, Congress enacted P.L. 100-407 with the purpose of extending the availability of assistive technology to individuals with disabilities and their families.

"Assistive technology device" is defined by the bill as "any item, piece of equipment, or product system whether acquired off the shelf, modified or customized that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." The broad definition of devices and individuals included under this law gives states great flexibility in the programs to be developed.

Title I provides states with funds to develop a consumer responsive state system of assistive technology services. States receiving funds may develop or carry out any of the following: 1) model delivery systems; 2) state-wide needs assessment; 3) support groups; 4) public awareness programs; 5) training and technical assistance; 6) access to related information; 7) interagency agreements; and 8) other activities necessary for developing, implementing, or evaluating a state-wide service delivery system. Nine states have successfully competed for funds. Twenty additional states could be added in 1990 with the remainder to be added in 1991.

Title II of P.L. 100-407 authorizes the federal government to perform various activities to assist the states in the development of their service delivery systems. These activities include: a study to be undertaken by the National Council on Disability to identify practices which facilitate or impede financing of assistive technology devices and services; and, a study of the need for a National Information and Programs Referral Network to assist states to respond to technology-related information needs.

In the Fall of 1989, nine states were awarded funding to plan and establish statewide programs of technology-related assistance. These states included: Arkansas, Colorado, Illinois, Kentucky, Maine, Maryland, Minnesota, Nebraska, and Utah. For contact information about these programs in your state, contact the ***Center for Special Education Technology***, or the ***Association for the Advancement of Rehabilitation Technology*** (RESNA).

In addition to the state awards, the National Institute on Disability and Rehabilitation Research (NIDRR) awarded a contract to RESNA, an interdisciplinary association for the advancement of rehabilitation and assistive technology, to provide technical assistance and information to States on the development and implementation of a consumer-responsive statewide program of technology-related assistance under this law. For more information, contact RESNA (202) 857-1199.

Understanding and becoming aware of the laws relating to assistive technology can make a significant difference in how, where, and when you gain access to these services. For a listing of any of the groups mentioned in your area, contact ***NICHCY***, or the ***Center for Special Education Technology***, located at the Council for Exceptional Children, and ask for a State Resource Sheet. Ω

Photograph courtesy of the National Easter Seal Society

Effective Use of Technology with Young Children

by Mary L. Wilds, Coordinator

Technical Assistance Center #3, George Mason University, Fairfax, Virginia

Computer technology for young children has only recently been recommended for use in the home and applied on a large-scale in early childhood special education programs. Available technology and information about its use with young children has lagged behind that available to other groups for a variety of reasons, such as: the high cost of hardware, a limited amount of developmentally appropriate software, limited funds to investigate the potential of computers as a teaching tool, lack of skill on the part of professionals in creating a range of response modes, lack of training and skill in computer use by early childhood special educators and parents, and the fear that technology would overshadow the human aspects of early intervention (Berhmann, 1988; Hutinger, 1986).

In the past several years, however, changes have occurred which have made computer technology more accessible to early childhood educators, therapists, parents, and children. Equipment is now more affordable, a wide range of developmentally appropriate software is available, and a variety of response modes have been developed which allow almost any child to access a computer (Burkhart, 1980; Charlebois-Marois, 1985; Goossens & Crain, 1987). Publications and training have made early childhood educators, therapists, and parents more aware of the potential impact computers can have on infants and young children. The appropriate application of technology can assist families and professionals in learning about a child's capabilities. As more educators and therapists have successfully incorporated computer use in their early intervention and preschool programs and as parents begin using computers in their homes, there has been a growing acceptance of the belief that technology can serve to enhance, not supplant, one-to-one interaction with infants and toddlers (Lazzari & Wilds, 1989).

Skills for Interactive Use of Computers

Special educators and therapists using computers in their programs have learned that when some beginning skills are introduced, computers become less complex devices for preschoolers (Rettig, 1987). Introducing these skills can reduce the natural tendency for a young child positioned in front of the computer to bang on the keyboard and possibly become frustrated and lose interest in approaching the computer again or learning that the computer is a toy to react too, not interact with. With this awareness, parents and educators begin to think of the computer as more than a pacifier to keep children quiet. The primary aim should be to allow young children with disabilities access to the assistive technology which will be most appropriate to their needs and to provide for the maximum participation of the young child in social and educational environments. To reach this goal, many skills may be necessary for using this technology effectively. For families and programs with limited funds, these skills can be developed without access to expensive computers or technology devices. The following is a list of some of the beginning skills that should be considered. This list is intended to assist parents, educators, and therapists in adapting the computer's use to the child's current level of skills. Keep in mind that not all children will need total mastery of all of these skills. With some children, these skills can be developed simultaneously with the computer and adult intervention. Each child should be individually assessed to determine the potential benefits of technology.

Motor Skills
- range of motion
- press and release
- reliable and consistent motor movement

Visual/Perceptual Skills
- visual tracking and scanning
- figure ground
- form discrimination

Cognitive/Language skills
- cause and effect
- attention span (sustained or selective)
- object permanence
- means/end causality
- imitation
- one-to-one correspondence
- intentional behavior (desire to communicate)
- symbolic representation (recognize pictures)
- reliable yes/no response
- receptive understanding of commands
- making choices

Social/Emotional Skills
- initiating and terminating interactions
- turn taking and waiting for turn
- attending to an object or person
- following one-step directions

This list of skills may initially seem overwhelming, unrelated, or overly simple; yet these skills are included in most preschool checklists and taught using other materials. In addition, these skills can be introduced and taught by using simple and inexpensive toys and switches. Toys and switches are concrete objects that are naturally motivating to young children. Many battery operated toys can be used to teach a young child many of these skills, and any toy operated by batteries can be adapted for switch activation. By adapting toys for use to introduce and teach these beginning skills, teachers, therapists, and parents can help a young child prepare to use computers and other assistive technology. Once children have some experiences with toys and switches, they are better prepared to have successful interactions with the computer.

How to Select Battery Operated Toys and Switches

The importance of play for very young children cannot be overemphasized. For children who have a physical disability or who are generally uninterested in manipulative toys, battery operated toys that are adapted to work with single switches can be used. Battery operated toys and switches can be the tools for developing play skills with objects and with peers. They also provide children with physical disabilities increased control over the classroom and

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home environment (Musselwhite, 1986).

Selecting toys and switches for young preschool-aged children requires that parents, teachers, and therapists consider several important factors. The most important factor is to become an expert. Make a list of your young child's strengths and needs and choose toys which meet your child's requirements. Collect information from parent support groups, toy lending libraries, information centers, manufacturers, and through exchanges with other parents, teachers, therapists, and others. (Additional resources are listed at the end of this ***NEWS DIGEST***.)

When purchasing battery operated toys, it is important to remember that there are different kinds of toys. It is important to consider a variety of battery operated toys that reflect a range of sensory inputs. For example, toys with flashing and multicolored lights provide visual input; tape recorders, musical, and other noisy toys (e.g., animal sounds, sirens) stimulate a young child's auditory senses. Blowing fans and vibrating toys provide tactile and vibro-tactile input. Toys should also provide for a variety of movement patterns: stationary, horizontal, vertical, and circular movement. Examples include a drumming bear, a walking robot, a fireman going up and down a ladder, and small train or car track sets. Toys should be chosen that can be easily incorporated into play routines (Musselwhite, 1986), as well as for their motivation and age appropriateness to the individual child (Greszko, 1988).

As with the purchase of toys, the teacher, therapist, and parent should acquire a variety of switches that can be used with children on different developmental levels and physical skills. Finding an appropriate switch or switches that match the child's physical requirements is extremely important. The child must have a reliable motor movement that can consistently activate the toy. As the child becomes more capable, the more reliable motor movements available to activate switches will provide a means of more efficiently interacting with his or her environment. Recent technology (Greszko, 1988) has provided a variety of mechanisms for these children to activate toys other than simply using a switch activated by a press of the hand. For example, children can use an eye-blink switch or a puff switch to activate a device. Pressure sensitive switches that require only a minimal amount of movement are now on the market. Voice activation of devices is also now possible.

Computer Application

Once children have a variety of experiences with toys and switches, they are often better prepared to have more successful interactions, not reactions, to the computer. A wide variety of appropriate and inexpensive software is now available for preschoolers. Software for microcomputers generally falls along traditional academic and readiness domains and uses color, graphics, animation, sound, and voice synthesis for this population. When introducing computers to very young children with disabilities who have been exposed to the toys and switches noted previously, it is important to minimize the number of new concepts and skills. Most of this software is written for the Apple II series of computers, which is the computer available in most schools. This software can be used with a variety of peripheral devices that are appropriate for preschoolers. The keyboard is very busy, and young children are easily distracted or unable to focus on a limited selection of keys that activate the computer. Commonly available peripheral devices include touch monitors, adapted keyboards and touch pads, voice activation, and switch interfaces. The ***TouchWindow*** by Personal Touch is a touch-sensitive screen that is placed over the monitor. This screen allows the child to use direct selection, touching the monitor, to activate the software. Touch pads include the ***Muppet Learning Keys*** by Sunburst and the ***Power Pad*** by Dunamis. These pads can be modified into single or multiple switches and adapted keyboards. The Muppet Learning Keys, for example, have the alphabet in order, as well as a ruler that illustrates numbers, and a watercolor set for color selection.

Introducing technology to very young children with disabilities is still quite early in its development. While there are many obvious potential benefits to early intervention using this technology, the state of the art is still not sufficiently advanced to enable parents and professionals working with these children to meet their needs easily. However, these children can be trained in many of the skills necessary for successful use of computer and augmentative communication technology without the use of expensive or complicated equipment. Thus, when they are physically and developmentally ready to use available technology, these children will be able to receive the maximum benefits that technology can make in quality of life and the ability to learn and to become as independent as possible. Ω

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Integrating Technology into a Student's IEP

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The use of this model requires knowledge and understanding of the technology that is available and potentially accessible. For the purpose of this model we have identified and defined broad technological categories which include, but are not limited to those described below.

Sensory enhancers

Sensory enhancers are adaptive/assistive devices and/or software which allow a sensory-deficient student access to the environment through the use of technology. Individuals in the following categories can be served: hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, orthopedically impaired, other health impaired, deaf-blind, multihandicapped, and specific learning disabled. Following are examples of types of sensory enhancers:

- audio output devices
- augmentative communication aids
- braille writers (input/output)
- character magnification devices
- digitizers
- electronic scanners (with speech synthesizers)
- eye movement detectors/eye sensor devices
- voice analyzers and recognizers.

Keyboard adaptation and emulators

Keyboard adaptations are alternatives to using the standard keyboard to input data. Keyboard emulators are peripheral products that make the computer "think" that its own keyboard is being used. Examples of keyboard adaptions/emulators are:

- alternative key pads (sketch pad, graphic pad)
- bar code scanners
- fist/foot keyboard
- firmward card
- joy stick
- key guard
- light pen
- membrane keyboard
- mouse
- touch screen.

Environmental controls and manipulators

Environmental controls and manipulators modify the operation of a device to compensate for environmental restrictions due to a student's handicap. Some examples of environmental controls and manipulators are:

- adaptations of timers, light switches, telephone/radio amplifiers, headphones, buzzers (environmental control systems)
- control mechanisms with sonar sensing devices
- pressure plates
- robotics
- additional external switches and sensors (eyebrow switch, breath switch, pressure switch)
- telecommunication devices for the deaf (TDDs).

Instructional uses of technology

Instructional uses of technology are those which utilize software and/or related applications of technology which allow the student full educational opportunity. Examples of the instructional uses of technology are:

- Computer-assisted instruction (software for drill and practice, simulations, tutorials, demonstrations, problem-solving)
- computer-managed instruction (tracking and placement, grading display and analysis, scheduling, and various information management tasks)
- computer-supported activities (word processing, data bases, spread sheets, utilities)
- video disks
- telecommunications
- alternative languages (LOGO).

Motivational devices

Motivational devices encourage the student to interact with his/her environment through exploration, manipulation, and play. Two motivational devices are:

- battery operated devices
- modifications of toys and games.

Student assessment/evaluation considerations

The student assessment/evaluation process, as outlined in Public Law 94-142, Section 300.532, states that "... the child is assessed in all areas related to the suspected disability, including, where appropriate, health, vision, hearing, social and emotional status, general intelligence, academic performance, communication status, and motor abilities." In addition to the traditional assessment and evaluation of students, the use of technology to facilitate maximum handicapped student potential needs to be considered.

The traditional evaluation focuses on the identification of the nature of the handicapping condition so that appropriate services may be made available. This evaluation usually provides information regarding the student's current educational functioning so that an intervention program, which is tailored to the needs of the student, can be developed. Evaluation procedures are in accordance with Sections 300.530–300.534, which state that "...tests are selected and administered so as to best ensure that when a test is administered to a child with impaired sensory, manual, or speaking skills, the test results accurately reflect the child's aptitude or achievement level or whatever other factors the test purports to measure, rather then reflecting the child's impaired sensory, manual, or speaking skills (except where those skills are the factors which the test purports to measure)..."

Technological considerations augment the traditional evaluation by providing information about the student's ability to access and use technology. Inclusion of technological considerations helps to en-

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sure that there has been a total review of the nature of the handicapping condition. Technological considerations should be an integral part of the student assessment/evaluation process so that the IEP reflects the unique needs of the handicapped student.

The following questions identify content of traditional assessment/evaluation reporting and suggests the addition of questions which would support technological considerations.

Traditional and technological considerations

- **Health**

Traditional: Does the student have any acute, subacute, or chronic health problems? Does the student have a progressive and/or degenerative condition?

Technological: Given the student's attendance record, could the use of technology allow the student more continuous access to school and the curricula? How can technology be used to compensate for the effects of a degenerative condition?

- **Visual**

Traditional: What is the student's visual acuity? What is the student's tracking ability?

Technological: What kinds of physical adaptions need to be made to allow the student to access technology? How will technology allow the student to utilize compensatory senses; i.e., could a student use a magnified screen or does s/he need large print on the screen? Is the student able to discriminate presented visual stimuli? Would speech-produced input facilitate learning?

- **Hearing**

Traditional: Is there a decibel loss? How will the decibel loss affect the student's ability to learn?

Technological: What adaptions will allow the student access to the instructional program; i.e., how can technology (micro-computer, software, and a voice entry system) help to produce vocalization training? Would speech output facilitate learning? Is the student able to discriminate presented auditory stimuli?

- **Social and emotional status**

Traditional: How does the student respond to differing social situations? What are the student's basic character traits?

Technological: What is the positive/negative psychological impact of the use of a computer with certain students; i.e., how will the student who has normal intelligence, but no means of expressive communication, deal with the use of a computer to provide his/her voice? What is the impact of the use of technology to the environment, peers, class?

Photograph courtesy of the National Easter Seal Society

- **General intelligence**

Traditional: How does the student perform on a standard IQ test? What is the student's potential for learning?

Technological: Does the student have the ability or will the student develop the ability for higher cognitive functions that will allow for conceptualization, symbolization, generalization and abstraction; i.e., will the student be able to understand cause/effect relationships when making a selection on the computer, causing it to output information? Does the student have the notion of causality and the desire to bring about an effect? Does the student have the cognitive ability to learn and remember the use and operation of given devices? Does the student have symbolic functioning; i.e., the ability to associate a symbol or set of symbols with units of experience?

- **Academic performance**

Traditional: How does the student perform on a wide range of screening measures which reflect achievement?

Technological: How can the current level of achievement be affected by the use of technology; i.e., how will the use of drill and practice, educational games, simulation, demonstrations, tutorials, problem-solving, word processing, information search and retrieval, graphics, and/or spread sheets, affect academic performance? Will the use of technology affect the speed of learning? Will the probability of the learner achieving his/her goals and objectives set forth in the curriculum be increased?

- **Communication status**

Traditional: What is the student's receptive and expressive language ability? Does the student have any problems with voice, articulation, and fluency which affect the production of spoken language?

Technological: What is the relationship between the student's level of expressive and receptive language; i.e., how will the use of technology affect the student's ability to communicate? What skills are present (spoken, incomprehensible but consistent, written, speed of communication with and without device)? What is the present language structure (nonvocal from birth, nonvocal from injury)? Does the student understand the intent to communicate? What is the symbolic level of functioning? How will speech output affect the student?

- **Motor abilities**

Traditional: What are the student's abilities in gross motor and fine motor skills?

Technological: Given the student's degree of motor control and ability, what methods could be used to access technology; i.e., how accurately can the student point? How long can the student keep his/her finger in one location? Can the student hold/move an adaptive/assistive device? What are the available range and dependability of movement? What is the strength of the available movement? What is the accuracy of the

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A Parent's Perspective

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do parents keep up with the ever-evolving technical knowledge so that they can make wise and appropriate decisions?

The funding issues are very challenging for schools and programs that work with special kids. They are even more difficult for families. This is one of the stresses that affects families that already have enough stress to deal with. The paperwork that accompanies insurance claims and the type of coverage most families can afford is part of the problem. The other part is finding the funding when insurance doesn't provide coverage. We have purchased many things for Colin and have constructed many more ourselves because we couldn't afford to purchase them. I sometimes envy the lower income families because they actually have better funding with the state and federal assistance than families who don't qualify financially. We built Colin his early chairs and standers and did a lot with loaned equipment from other facilities and families. When we wanted to buy him a computer and the adaptions to run it, we chose to get community assistance. A letter was written and mailed out to local organizations. We received the funding and made some nice connections in the community. We did, however, have to put Colin on display at fund raisers, a concept that I didn't care for. When we ordered Colin's big mobility system and communication device four years ago, our choice was made with funding being an important factor. Our insurance would cover the power chair but not the communication system. So we put them together for ordering purposes and used the communication system to drive the chair. We ended up not getting the mobility system Colin could operate easily by doing this but how else could we fund a very expensive communication system, and who covers the cost of the ramp needed to get the chair into our home or the van and lift to transport him?

Families need someone to go to for help in managing their funding concerns. A lot of time and energy is used up and compromises are sometimes made that are not in the best interest of the children. In their effort to find the right equipment, parents are often placed in a position of making decisions without knowing all the options. Relying on the equipment companies to provide information or using the expertise of a salesman only adds to their dilemma and confusion as they are obviously biased. Maintenance and repair of the equipment becomes a problem if a product is chosen that is not carried by the company that services the area in which the family lives. It is important for parents to find assistance from someone who can show them a variety of systems and can listen to their needs and concerns. I think a trial period on the equipment is a good idea. Some vendors will allow the family to try the equipment for a week or a month. This gives the families a chance to become familiar with the device and actually see if the child can learn to use it. Otherwise parents may spend thousands of dollars on equipment their child will never use.

The other issue is "how do we keep up?" Technology is moving ahead at such a rapid rate that it is overwhelming for non-professionals. Classes in computer technology that I took five years ago, are not valid anymore as the devices I learned about are almost obsolete. For teachers and therapists without access to major hospitals or treatment centers specializing in children with disabilities, it is very hard to be knowledgeable about current technology. Families may find it very difficult to keep up without major expenditures of time, energy and money.

In a time when there is a lot of talk about case managers and family empowerment, these questions are important to ask. Is the concept of a technology advocate being addressed? This could be a person who has current knowledge of assistive technology and can help families to select systems by explaining all the options available. The advocate could also assist families in learning how to use the equipment and handle maintenance issues and routines for usage. Funding strategies could be explored by someone besides the parents thus decreasing stress and protecting the family's privacy and self-esteem. Maybe families could avoid some of the pitfalls that come with high-tech answers to very emotion-filled problems.

The whole idea of technology for kids, little kids, is an exciting yet emotional subject. So many things can be accomplished with computers. This can give children the power of speech, the ability to produce written materials, to manipulate pages, to control their environment in many different ways and to compete with their peers. How exciting this is for the parents of children with otherwise little ability to be involved. I remember how exciting this whole area was for me four years ago, as we prepared for and finally ordered the "big system" for Colin. I thought this would be the answer to all of our frustrations and limitations. Finally, Colin could feel some independence and things could be more normal.

But technology is not the sole answer. Without it, Colin has little chance but with it the chance is only slightly better. The bottom line is that it takes a lot of commitment and follow-through on the part of parents, teachers, and everyone who works with a child. These assistive devices are only the beginning of a long road to independence, not the end. It takes a tremendous amount of work and coordinated effort to make it usable. Indeed, sometimes it seems like more work and hassle to use the technology than to use the more convenient manual boards and eye pointing strategies we were used to. These strategies are always available, do not need to be programmed, turned on, or have their batteries charged. It reminds me of an afternoon, recently, that we spent at a children's center nearby doing trials and assessment on communication systems with Colin. The therapists there had set out and programmed three different devices for us to try. They put them in front of Colin who was excited with all three and they worked and played for several hours. When, at last, they were finished and had removed the array of keyboards and monitors, exposing Colin's own manual alphabet on the wheelchair tray, Colin began to spell in earnest. The experts sat and watched intently as he very clearly and urgently spelled out P-O-T-T-Y. The message had not been programmed into any of the fancy systems that had been covering his tray. We need to work on both manual systems that offer convenience and tech systems that offer advancement and independence. Technology can't do the job alone.

I have, thus, learned not to put all my eggs in one basket, so to speak. We need to work on many fronts if we are to get the success we want for our children. Tech-

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nology is just one of those fronts. We need to spend as much time teaching our children to have self-esteem, to have appropriate social skills, to be survivors, to care about others, to be able to communicate basic wants on their own in case the system breaks downs, to be able to protect themselves and to be happy with their lives. We also need to teach the rest of the world to be accepting and tolerant. We need to prepare a place for our children to live as adults.

We taught Colin to make choices and the choice he made four years ago was not to use the "big system" we had chosen for him. In all our excitement to purchase the technology for him we had forgotten to look at how he wanted to operate such a system. We purchased him a head pointing system and he wanted to touch with his hands. He would just put his head down and tune us out. I still believe this was a good device for Colin's body. He had less tone in his whole body, less drooling, and the capacity for more speed in his responses. There must have been something about it that he couldn't deal with. All the assessments, videotapings, and discussions had dealt with the right components but not with the whole child. What about his need to directly visualize choicemaking and his growing need to manipulate things with his hands? I have learned that we need to look at factors other than the obvious, testable, measurable ones. Maybe we need to include our children, even the children who do not seem to have the ability to understand the process, in our decision making and to respect whatever input they can give us.

Another factor that makes technology especially difficult for young children is our inability to predict the future. I look at my son's growth and maturation as being more of an evolution. His disabilities mask so much. As we slowly work our way through the things that limit what he can do, we discover more and more about what he is able to do. I am amazed, as well, at how many unpredictable factors are in his life. Just changing his medications or even the dosages, alters not only his body but, more subtly, his personality and his cognitive performance. How can we choose a very expensive piece of sophisticated equipment with the hope that it will last him ten years? I have no idea what Colin will be like in ten years or even next year. We can't wait to offer him the advantages of technology though. We have to deal with now and sort of bank on the the future.

But I have confidence that he'll do everything we expect him to do and probably more. Every chance Colin has to do things on his own he takes. He taught himself to read and to tell time. Last week, he indicated on his alphabet broad that he wanted to watch SCOOBY DOO on TV. We should know better than to question his memory but we looked in the TV directory to see if it was on. Sure enough, it was just starting. So, to let him know he was right, we showed him the directory. Now he wants to look at the directory every day to see what's on. We have done all we can think of to give him a sense of control in his life. Giving him the power to communicate his wants has been wonderful, but communicating at a higher level has been even better. The day he said SORRY after he had screamed uncontrollably about something, or the first MOMMY and I LOVE YOU are treasures for us. What a wonderful thing; to be able to express thoughts and feelings. He even tells jokes and laughs. Thank goodness we could unlock some of those doors for him.

Last night, after several helpings of dinner, Colin looked up and grinned. M-M-M-DELICIOUS MR PIG ALL DONE. I'm afraid not, Mr. Colin you're not all done by a long way! Ω

Technology in a Student's IEP

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actions? What are the speed and force of the actions?

- **Additional**

Technological sophistication of the user: What previous experience has the user had with gadgets, switches, adaptive/assistive devices, or interacting with a computer? Will fear keep the student from accessing the technology? What is the student's motivational level?

Selection of technological devices and software

Once the evaluation/assessment has been completed and the goals/objectives have been defined, the general categories in which technology may be appropriately used may be selected. When reviewing the categories, it must be determined whether the technology will facilitate input, processing, and/or output. Within and across these categories there are numerous catalogs and software that are available. Most of these listings also include additional sources, such as professional organizations and newsletters.

Photograph courtesy of the National Easter Seal Society

By knowing the specific goals and objectives for the student, review of resource catalogs and recommended equipment will be easier. Reviews in these catalogs will differ in format and content, but by collecting information from a variety of sources, it will become apparent which devices/software will be appropriate to meet specific goals/objectives. From the identified adaptive/assistive items, a more student-specific analysis may then be completed.

Identification of the operational characteristics of selected devices and software

When specific devices/software have been identified to facilitate maximum handicapped student potential and ensure placement in the least restrictive environment, a detailed analysis of the use of technology must occur. Technological devices/software need to be analyzed with the following considerations.

Operational characteristics

- functional utility
- availability
- costs

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Becoming an Informed Consumer

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Tutorials. These programs introduce new skills or concepts. It is assumed that the learner has not been introduced to the material presented in the software. The child may have learned related skills, but the content of the software is essentially new. Because the content is new, the learner will need guidance and supervision which aids understanding and teaches correct use from the beginning.

Simulations. Simulations are a type of problem-solving software. The learner applies skills and information that they have mastered. Simulations place learners in real life situations. The learner applies rules, uses facts, and draws conclusions to solve a problem. In addition to academic skills, simulations require good coordination and keyboarding ability. The necessary academic and physical skills should be assessed when considering this type of program for a child with a disability.

Games. Computer-based games can be either drill and practice or problem-solving activities. Arcade-style games are usually drill and practice programs. The learner practices skills by competing with the program in which facts or problems are presented. The learner is timed and gets points for giving the correct answer within the time limit.

Tool Software. This software helps the user find, organize, and reorganize information. Word processing programs, database management systems, and music or graphics editors are all examples of tool software. No content is specified with tool software. Instead, the program provides a framework for writing, creating files, or drawing. To use a word processing program or a spreadsheet, the learner must become familiar with its features. Tool programs are more versatile for home use than drill and practice or tutorial programs and family members can use them for different purposes.

Many possibilities exist for computer learning at home. Yet, because of differences in age, skills, and interests, few products will appeal to all members of the family. Knowing how your child learns and thinks about his or her strengths or weaknesses is important for it can affect learning.

Selecting Assistive Technology Equipment: Becoming Informed

Technology is an investment. Therefore, consumers should become more informed and critical of the limitations of technology. Consumers should also be aware of alternate possibilities for achieving a specific goal.

In addition to standard considerations such as cost, available software, expandability, ease of use, and available peripherals, it is also important to consider how adaptable the hardware is. For students with special needs, adaptability in most types of materials is necessary. For example, students with physical disabilities might need to use switches which are operated by a head movement, a head wand, a foot switch, an eye blink, or a sip and puff method. Students with a visual impairment may need a speech synthesizer. For students with a moderate disability, a combination of speech synthesis and alternative inputs may be necessary. For students with behavioral or attention disabilities, timing is important. In addition, a special feature that is essential to these students is just how fast the computer can load programs from the disk.

Fortunately, there is a wealth of information that parents and professionals can access, thus allowing them to make informed choices about the products they purchase and the services they select.

1. Where to Begin. If you are interested in using computers or assistive technology with your child but do not know where to being, start by reading general information on the subject. There are books available as well as publications, some of which are specific to special needs.

2. School and Community Services. Print information alone may not be enough to help you with your technology decisions. You may need to contact agencies and organizations that provide special services. To do this, first become aware of resources that exist in your community. Local resources can supply personalized assistance to fit technology to your child.

Perhaps the most important community resource is the school. Your child's teacher can often help you assess the potential of using technology at home given your child's needs. The teacher may also be able to guide you in selecting appropriate software for you child. Some districts allow parents to borrow computer equipment for home use.

Another local resource is a computer users' group. User groups can provide valuable information about the use of software and hardware. Technical questions can be answered by members who are experienced with both. Check with your local computer dealer or telephone directory to find a user group in your area. Computer manufacturers may also know of a local user group.

3. Specific Information. If you are looking for information about using technology with a child with a specific disability, try contacting the local chapter of the disability organization serving that population. For example, if your child has a learning disability, contact the local Learning Disabilities Association of America (LDAA).

Other organizations like the Easter Seal Society and the United Cerebral Palsy Association often provide direct services to families and to local schools in the use of technology.

Given the number and different types of computers that are available today, it is almost impossible to do a comparison. Generally, though, one or two factors tend to influence your decision to purchase particular equipment. These factors might include specific software compatibility, cost, or compatibility with other computers in the school.

Some questions to ask when considering a computer system are:

- Do the software programs you plan to use run on this computer?
- Is the amount of memory of the computer sufficient to operate the software you plan to use?
- Can the memory be expanded?
- Is a color monitor necessary?
- Does the software you plan to use work with the printer?
- Can the printer print graphics?
- How much will the total computer system cost (including monitor, printer, disk

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drives)?

While you may not be able to afford all the options you want initially, think of the future. You will want a computer that can be useful in a number of situations and can be adapted to suit different needs.

4. Hardware. Hardware information may be harder to find locally. Computer dealers that sell computer systems can usually be found in most cities. Companies that sell assistive or adaptive equipment may need to be contacted directly.

Photograph courtesy of the National Easter Seal Society

5. Software. Your local public library can be a gold mine for information on computer software. Some libraries set up mini computer labs for the public use.

Another source for software information is your local computer store. National chains such as B. Dalton and Egghead carry a good selection of instructional software for all ages. Some software companies cater to the home market. Scholastic and Broderbund issue home market catalogs so you can shop by mail.

Some parents may be able to contact special software preview centers, operated by school districts or universities. Since most of these preview centers cater to teachers, call first to make sure parents are welcome.

6. Assistive Technology. If you don't know what assistive equipment is needed, local hospitals and community rehabilitation or vocational centers may be active in designing and fitting assistive devices to complement your child's capabilities. Some states have established centers to provide information about particular devices.

7. Funding. Finding funding for technology devices requires an individualized approach. To begin your search, check out resources that are available to you locally, such as the Lions or Kiwanis Clubs, and religious organizations.

Nationally, the Easter Seal Society in connection with IBM has an assistance project that allows eligible persons with disabilities to purchase discounted computer systems.

Additional funding sources may soon emerge with new federal legislation and more national interest in technology by insurance companies.

To really make technology work for you and your child, it is important to become an informed consumer. Use the abundant resources available; read about technology, talk to others who use it, and try out various technology options before you buy. Ω

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Technology in a Student's IEP

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- installation criteria
- integrative capabilities
- portability
- unique operations
- limitations
- maintenance
- required technological sophistication for instructor
- formal evaluations
- durability
- flexibility
- product research

User behavioral characteristics

- health
- vision
- hearing
- social and emotional status
- general intelligence
- academic performance
- communication status
- motor abilities
- technological sophistication

Technological match

At this step, the assessment/evaluation information for a specific student is matched as closely as possible to the identified operational characteristics of selected devices/software and user behavior characteristics. When the evaluation/assessment—which includes both the traditional and the technological considerations—is completed, the IEP that is developed will be one that takes advantage of the full range of available options.

Summary

The use of technology must play an integral part in allowing the handicapped student access to his/her environment. It is the responsibility of educators to see that advanced technology is used to maximize student potential and allow the handicapped student full access to society. Ω

The *Rural Special Education Quarterly* has recently published a special issue, *Topical Issue: Technology and Rural Schools* (V. 9, N. 4, Winter 1989). This issue covers a broad spectrum of technology applications among rural special education populations. For more information, contact the National Rural Development Institute.

Starting the Funding Process

by Suzanne Ripley
National Information Center for Children and Youth with Handicaps (NICHCY), Washington, DC

Funding the purchase of assistive technology devices and services of any type can present overwhelming obstacles to families. Equipment costs, along with the service time needed to train an individual in its use, can be high at times, and may need to be updated, augmented, or replaced several times in the coming years. It is encouraging to know that funding is very often available; it may be an arduous task to locate sources and complete forms and questionnaires, but your efforts can pay off.

The following discussion is an overview of the options for a wide range of assistive technology for a wide range of families. Funding is almost as individual as the family applying: it can depend upon the child's needs, the equipment being considered, the potential impact of this equipment, the income of the family, and other issues. Funding may pay for an entire system or cover a small part of the expenses. Once families understand that funding is available, that the process of identifying funding sources and the task of completing the paperwork can be immense, that the entire operation can be slow-moving, and that patience, attention to detail, creativity and stamina are essential, success may be theirs. You may find the information that follows a useful beginning to give you some ideas of getting your investigation underway. These are by no means all the options available; this is an overview. The bibliography at the end of this ***News Digest*** lists many additional resources who can provide detailed information on funding. Creativity and networking are the key: this is the first step.

The Client Advocate.

The most efficient and easiest way to begin this process is to locate a Client Advocate. This is a person who is experienced in acquiring funding for assistive technology.

The Client Advocate is frequently a parent of a child with a disability who has been successful in advocating for special education and related services, including assistive technology. The Client Advocate can assist families in selecting, purchasing, and funding assistive technology. Sometimes the Advocate is a professional working in the field or associated with a disability or parent group interested in assistive technology. This person should be familiar with children like yours, familiar with a range of assistive devices, knowledgeable of the entire funding process and, above all, persevering. To locate a Client Advocate, talk to the company selling the equipment, talk to your child's teacher or therapist, talk to disability and parent groups in your area, and talk to other families. The company selling the equipment you are interested in purchasing may be able to put you in touch with other families in your state who have purchased the same or similar equipment or devises. People who've purchased the equipment have undoubtedly also looked into funding availability and can give you tips on whom to call. If the company is reluctant to give out the names of other families, you can suggest they contact these families privately and request that they contact you. This avoids any concerns for privacy, yet still enables you to get in touch with the other families.

If you cannot locate a Client Advocate in your area, you can call the state chapter of a major disability organization, such as United Cerebral Palsy, Spina Bifida Association, American Foundation for the Blind, Easter Seals or a similar organization and ask them to help identify a Client Advocate. You may wish to contact a national association concerned with children who have needs similar to yours to ask for their help. The social work department at the nearest major children's hospital may also be able to help. If you have difficulty finding such organizations, you can contact ***NICHCY*** to provide referral to appropriate groups.

The Funding Coordinator.

Another person who can be of immense help is a Funding Coordinator, if available. A Funding Coordinator is a resource person with the equipment vendor or manufacturer who is responsible for providing funding assistance. Different companies may use slightly different terms for this position, but basically this is someone employed by the company who is knowledgeable about the funding process. Ask the company from whom you are planning to purchase equipment if they have a Funding Coordinator you can contact. Client Advocates and Funding Coordinators should be able to discuss a variety of funding sources with you and be able to narrow the list down to those sources from which you may be most eligible to receive assistance.

Keeping Records.

Throughout the process of research for assistive technology for your child, it is vitally important that you keep detailed, complete records of all reports and medical and educational documents pertinent to the equipment you are considering. No matter who the sources of funding may be, every one of them will require extensive paper work to substantiate the need for the equipment and its potential effectiveness. You will be asked for copies of doctor's reports, therapists' reports, evaluations, school reports and records of your child's needs and progress. Even if the evaluation resulted in a recommendation against the purchase of a specific device, this documentation may be useful in establishing need for more complex equipment. Remember, it is always possible to throw out unneeded documentation; it may be impossible to retrieve missing records. Also remember, NEVER send anyone original copies of these documents, always make copies.

You will also need to establish some sort of correspondence filing system of people and vendors you have contacted. All letters you've written, people you've phoned, and referrals you've received should be kept. People who could not be of help one time may be the very people you need to contact another time. Again, the

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guideline to the assembly of your files should be: It is better to keep too much than too little.

Getting Started.

It is never too early to start the funding search. Even if you haven't yet identified a particular piece of equipment or met with the professionals who will evaluate your child's needs, you can begin your search for funding sources. It may be that funding will be combined from a variety of sources, it may turn out that only certain types of equipment can be funded or that specific documentation is required and this may influence your choice of evaluators and equipment. If your family has medical insurance, you should notify the company of your intent to purchase equipment. Insurance companies vary widely in requirements for filing claims and may require certain documentation at specific times or intervals. You will not be contacting the insurance company to ask their approval but rather for information about filing claims for assistive equipment. If the agent says there is no such coverage, request printed information on your coverage and filing guidelines anyway. Sophisticated technology is relatively new for insurance companies and you may need to appeal your claim. This is why the documentation is so important.

Insurance companies are most likely to pay for medically-based requests. This means that the equipment you are interested in purchasing must be prescribed by a doctor or a doctor has given you a WRITTEN recommendation to purchase this equipment. Documentation should show that your child needs this equipment for medical reasons, or at least partially for medical reasons. For instance, a motorized wheelchair would be based on a medical need; the portable computer might not. However, the insurance company might pay part of the claim for the motorized wheelchair. Letters of medical necessity can also come from therapists, clinics and the parents themselves. The insurance booklet which describes coverage should have a description of guidelines both in terms of the specific equipment you wish to have funded and the documentation you collect. Letters and reports will need to justify the particular medical situations described in your insurance plan. The bibliography at the end of this *News Digest* list resources for additional information on insurance.

Some families may be eligible for medicaid. For specific types of equipment under very specific circumstances, a child may him/herself be eligible for medicaid under a waiver plan. To find out more about this, talk to the Client Advocate or Funding Coordinator, if you have found one, or contact your local medicaid office. If you can't find a medicaid office, call the local branch of the state social services office and their staff should be able to direct you.

If your insurance claim has been denied, you can inquire about appealing the claim. Families are successfully using the appeals process to fund assistive technology. An insurance agent can discuss this process with you. Your most powerful advocate in working with denied claims and extent of coverage may be your state's Insurance Commissioner, whose number should be available from any insurance company or state government office. It may be listed in your local telephone book under state offices.

Other Funding Sources.

While insurance policies come to mind first in seeking support for the funding of assistive technology, they are by no means the only resource. Some equipment may be funded, at least in part, by the school system. It is important to note that there are no federal regulations which describe this issue in detail. Therefore you, will need to talk to the special education department, your child's therapist and perhaps the state department of special education for details. While schools have paid for certain types of equipment in the past, it is important to remember that if the school system buys the device then they own it. This means that the school system may have policies which place restrictions on where this device may be used, on whether or not it can be taken home after school and during vacations, and what happens to the equipment if your family moves and when your child graduates. This may not be a problem for you; if your child outgrows his need for a device, you will not own unusable equipment and the school will be in the position of offering technological help to another child in need. Be sure to discuss liability insurance and responsibility for repairs if you are "borrowing" school equipment. Whatever the means and steps, schools can be of help in selecting and purchasing assistive devices for children and youth. Work with your school through the assessment and IEP process to identify potential needs and benefits of assistive technology and the school system's role in providing it. Assistive technology is often a related service. Ask the school about your rights in this area. To learn more about your rights, contact ***NICHCY***, or the Parent Training and Information Center, or State Protection and Advocacy system in your particular state.

In some cases, it may be wise to become involved with the PTA, and other school fundraising activities to help increase awareness of the benefits of assistive technology. This collaboration may be the right vehicle by which you access necessary equipment for your child as well as other children.

Parent groups and disability groups may be able to identify other sources. Again, other families who have purchased equipment and successfully identified funding are an excellent resource. Either visit these organizations or place an article in their newsletter seeking help from another family. It is obviously most helpful if you can find a group specifically concerned with your child's disability; however, any group interested in issues of children and youth with disabilities who use any type of assistive technology can be of help.

While other families may be hard to locate because of right to privacy, you can always place an announcement in a special interest newsletter or magazine, or local paper. You can give your name, address and phone number and ask people to get in touch with you. This may be particularly useful if you live in a rural area or cannot easily attend meetings in the evening. You may even find it useful to place an ad on a bulletin board at the local library, in the hospital, or at a nearby school. The school need not be one your child attends or even a school for children your child's age; the goal is to locate families who have pur-

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Starting the Funding Process

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chased assistive equipment and to find outside funding to help with the costs.

Nonprofit civic organizations may provide funding in total or part. For details on what sorts of equipment are funded and how much is allowed per person, contact groups such as the United Way, Kiwanis, Rotary, Lions, Shriners and Masons. Some may offer to match funds provided by other organizations. In some cases, they may be able to provide funds for evaluations or help with travel costs and arrange lodging for families who will need to go to other towns for evaluations.

Private corporations and local businesses may become involved in the purchase of equipment to help a local family. This can be of benefit to the business by providing positive local exposure and feelings of good-will in the community as well as providing tax benefits for charitable contributions.

Private and public fund-raisers are another resource. Churches and other religious groups, members of other organizations such as sports clubs, unions, PTAs or neighborhoods can successfully conduct fund raising events. Bake sales, raffles, dinners, yard sales and other creative ideas have been used to raise money to help families provide for their child's special needs.

Depending on the technology you are interested in, the Vocational Rehabilitation program in your state may be of help. Each state has a department of Vocational Rehabilitation; the number should be in your local phone book under state offices or available from your local public school. Remember that Vocational Rehabilitation services are state run programs and eligibility will vary from state to state. Competitive or supported employment is a realistic goal for youth with disabilities, therefore Vocational Rehabilitation offices may be interested in providing a student with the equipment he needs to reach his potential both educationally and in the area of personal independence. Contact this office and ask what kinds of funding they can provide.

Many banks have monies set aside for specific purposes called trust funds. The trust officer of a bank can tell you if there are funds earmarked for disability issues, assistive equipment, local philanthropy, members of certain religious groups, veterans, members of certain ethnic groups, etc. Be creative in asking your questions; there may be a fund which covers your needs.

There are even "wishmakers." These are organizations or individuals who grant wishes to people who have specific needs. You may be able to get a list of such people in your area by contacting disability groups, hospital social services departments, the local newspaper, or your Client Advocate. For example, the Sunshine Foundation is a national organization which grants wishes to children with chronic disabilities. They review each request individually and may fund the entire "wish" or fund part of a "wish" if it exceeds their financial limits. This is one of several such organizations. It is located in Philadelphia, PA, and can be reached by calling (215) 335-2622.

Tips To Remember.

If you have some ideas of funding sources when you visit evaluation clinics, you can discuss the requirements of these

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The process for funding assistive technology can be complex. This process can be made less frustrating and confusing by taking the time to think about your needs and developing a strategy. The following steps may help you to develop such a plan and to enter the funding process:

1. Assessing needs. Consider your child's strengths and needs and think about developmental areas where assistive technology may be beneficial, including: motor, communication, environmental, cognitive, and employment. Then list questions you have about assistive technology, and possible sources of information. Next, consider the costs. What are your financial resources, where do you think help is needed?

2. Make goals. From your list of needs, make goals. For example, your goal may be to locate types of augmentative communication devices for your child. Look at your list and prioritize each goal.

3. Plan activities to reach each goal. Determine specific activities which will help you achieve these goals. Activities include contacting resources for additional information about technology, obtaining an evaluation for your child, and beginning to plan a strategy for obtaining funding, among others.

4. Make a time line. For each activity, plan the time necessary to complete the activity. Sequence the goals in steps that will help you accomplish more difficult goals. In many cases, you will find that you can accomplish several goals at the same time, while other goals can not be started until more attainable goals are completed.

5. Contact sources of help. Begin to document your journey. Contact those who can assist you in your plan, and who may help you revise it. Keep records of contacts and documentation of potential assistive equipment, as well as any evaluations. Make a file with subdivisions to include these areas, as well as insurance and other financial information.

6. Locate a funding advocate. This may be one of the most important goals of your plan.

7. Devise a funding strategy. From the potential sources discussed, plan a funding strategy which encompasses each of those appropriate to your situation. Once again, a time line will be useful. It is possible that one source will fund a piece of equipment which can be useful until another funding source (or combination) is used to finance a more complete system, or advanced assistive device.

8. Evaluate your plan. Planning requires flexibility. Goals and strategies can be modified, changed, and deleted. Also, children grow and needs change. Remember to base your plan on your child's needs, and how best they can be met with any available assistance. Be prepared to modify your plan as your child grows, as needs change, as legislation makes technology more accessible, and as funding sources and other information become available.

funding sources with them. Reports can be written to provide the information needed by funding offices so your documentation will reflect the information most likely to gain approval for funds. This is also true when requesting reports from medical personnel, therapists, and schools.

Finally a word about taxes. As Ben Franklin said, "A penny saved is a penny earned." Expenses associated with applying for funding, including travel expenses, child care, long distance phone calls, lodging expenses, costs of evaluations and consultants may be tax deductible as medical expenses. The Internal Revenue Service, listed in your local phone book under U.S. Government, can provide you with a guide to deductions allowed for medical expenses. If you are unclear on particular items, you can phone the IRS and talk to their staff.

It's a complex task to locate and acquire financial assistance for assistive technology. It requires a real commitment and a positive attitude. It certainly requires time and organization, great attention to detail, following guidelines and rules to the letter, and providing impressive documentation. Other families have found funding and there is a good chance yours can also. Ω

FYI: Information Resources

Bibliographic Note:

You can obtain many of the documents listed below through your local public library. Whenever possible, we have included the publisher's address or some other source in case the publication is not available in your area. The organizations listed are only a few of the many that provide various services and information programs about technology and assistive devices for families and professionals. Additional support is also available from state and local parent groups, as well as from state and local affiliates of many major disability organizations. Please note that these addresses are subject to change without prior notice. If you experience difficulty in locating these documents or organizations, or if you would like additional assistance, please contact ***NICHCY***.

If you know of a group which is providing information about technology or assistive devices, or developing materials and programs in your area, please send this information to ***NICHCY*** for our resource collection. We will appreciate this information and will share it with other families and professionals who request it.

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International Business Machines Corporation (IBM), National Support Center for Persons with Disabilities. (1987). *Technology for persons with disabilities: An introduction.* Atlanta, GA: Author. (Additional *Resources Guides* also available from IBM, National Support Center for Persons with Disabilities, P.O. Box 2150, Atlanta, GA 30055.)

Office of Special Education Programs, Apple Computer, Inc. (1988). *Apple computer resources in special education and rehabilitation.* Allen, TX: DLM Teaching Resources. (Available from DLM, Inc., One DLM Park, Allen, TX 75002.)

Office of Special Education and Rehabilitative Services (OSERS), U.S. Department of Education. (1989). Making the promise of technology a reality. *OSERS News in Print*, 2(1). Washington, DC: Author. (Available from OSERS News in Print, Room 3132, Switzer Building, 330 C St, SW, Washington, DC 20202-2524.)

Prentke Romich Company. (1989). *How to obtain funding for augmentative communication devices.* Wooster, OH: Author. (Available from Prentke Romich Co., 1022 Heyl Rd., Wooster, OH 44691. Telephone: 1-800-642-8255.)

Pressman, H. (Ed.). (1987). *Making an exceptional difference: Enhancing the impact of microcomputer technology on children with disabilities.* Boston, MA: The Exceptional Parent Press. (Available from The Exceptional Parent Press, 605 Commonwealth Ave., Boston, MA 02215.)

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CHILDREN'S READING LIST

(An annotated bibliography of the following books and articles is available by contacting ***NICHCY***.)

Barr, L. (1988). *It's your turn at bat*. Frederick, MD: Twenty-first Century Books. (Available from Twenty-First Century Books, 38 S. Market St., Frederick, MD 21701.)

Detwiler, K. (1987). Wheelchair club. *The Exceptional Parent*, 17(6) 31-35. (Available from Psy-Ed Corporation, 1170 Commonwealth Ave., Boston, MA 02134.)

Fassler, J. (1975). *Howie helps himself*. Niles, IL: Albert Whitman & Company. (Available from Albert Whitman & Co., 5747 W. Howard St., Niles, IL 60648.)

Lasker, J. (1980). *Nick joins in*. Niles, IL: Albert Whitman & Company.

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MAGAZINES AND NEWSLETTERS

Augmentative and Alternative Communication Journal. Available from Williams & Wilkins, P.O. Box 64025, Baltimore, MD 21264. Telephone (301) 528-4000; (800) 638-6423.

BYTE. Available from BYTE, 1 Phoenix Mill La., Peterborough, NH 03458. Telephone (603) 924-9281.

The Catalyst. Available from Western Center for Microcomputers in Special Education, 1259 El Camino Real, Suite 275, Menlo Park, CA 94025. Telephone (415) 326-6997.

Closing the Gap. Available from Closing the Gap, P.O. Box 68, Henderson, MN 56044. Telephone (612) 248-3294.

Communication Outlook Artificial Language Laboratory. Available from Michigan State University, Artificial Language Laboratory, East Lansing, MI 48824. Telephone (517) 353-0870.

Computer Disability News. Available from National Easter Seal Society, 70 East Lake St, Chicago, IL 60601. Telephone (312) 667-7400.

The Computer Monitor. Available from Parent Advocacy Coalition for Educational Rights (PACER Center), Computer Resource Center, 4826 Chicago Ave. South, Minneapolis, MN 55417-1055. Telephone (612) 827-2966.

The Computing Teacher. Published by the International Society for Technology in Education. Available from University of Oregon, 1787 Agate St., Eugene, OR 97403-9905. Telephone (503) 686-4414.

Education Computer News. Available from Business Publishers, Inc., 951 Pershing Dr., Silver Spring, MD 20910. Tel (301) 587-6300.

Educational Technology. Available from Educational Technology Publications, Inc., 720 Palisade Ave., Englewood Cliffs, NJ 07632. Telephone (201) 871-4007.

The Exceptional Parent. Available from Psy-Ed Corporation, 1170 Commonwealth Ave., Third Floor, Boston, MA 02134. Telephone (617) 730-5800. (Subscriptions: P.O. Box 3000, Dept. EP, Denville, NJ 07034.)

Information From HEATH. Available from Higher Education and Adult Training for people with Handicaps (HEATH Resource Center), One Dupont Circle, NW, Suite 800, Washington, DC 20036-1193. Telephone (800) 544-3284; (202) 939-9320 (Local).

Journal of Special Education Technology. A publication of the Technology and Media Division of the Council for Exceptional Children. Available from Peabody College, Vanderbilt University, Box 328, Nashville, TN 37203. Telephone (615) 322-8150.

The Many Faces of Funding. Available from Phonic Ear, Inc., 250 Camino Alto, Mill Valley, CA 94941. Telephone: (415) 383-4000.

NARIC Quarterly. Available from National Rehabilitation Information Center (NARIC), 8455 Colesville Rd., Suite 935, Silver Spring, MD 20910. Telephone (800) 34-NARIC.

Rehabilitation Gazette. Available from Gazette International Networking Institute, 4502 Maryland Ave., St. Louis, MO 63108. Telephone (314) 361-0475.

Rehabilitation Technology Review. Available from the Association for the Advancement of Rehabilitation Technology (RESNA), 1101 Connecticut Ave., NW, Suite 700, Washington, DC 20036. Telephone (202) 857-1199.

Teaching Exceptional Children. Available from The Council for Exceptional Children, 1920 Association Dr., Reston, VA 22091-1598. Telephone (703) 620-3660.

Words from Washington, the **Networker**, and the **Family Support Bulletin**. United Cerebral Palsy Associations, Inc., Community Services Division, 1522 K St., NW, Suite 1112, Washington, DC 20005. Telephone (800) 872-5827; (202) 842-1266.

ORGANIZATIONS

TECHNOLOGY-RELATED INFORMATION RESOURCES AND CLEARINGHOUSES

Center for Special Education Technology- Operated by the Council for Exceptional Children (CEC), this national resource center collects and exchanges information about using technology in the education of children and youth with disabilities. Among the diverse services and publications available from the Center are the *Resource Inventory Series*, which lists national, state, and local information about agencies and organizations which offer technology-related services. The Center responds directly to inquiries from individuals and organizations. Contact: Center for Special Education Technology, The Council for Exceptional Children, 1920 Association Dr., Reston, VA 22091. Telephone (800) 873-8255.

IBM National Support Center for Persons with Disabilities- This Center helps individuals learn how technology can improve the quality of life for a person with a disability in the school, home, and work place. The Center has information on how computers can help people with a variety of disabilities, and provides information on where one can go for more information. Contact: IBM National Support Center for Persons with Disabilities, P.O. Box 2150, Atlanta, GA 30055. Tel: (800) IBM-2133.

National Rehabilitation Information Center (NARIC)- The Center provides information on disability and rehabilitation-related issues. NARIC provides responses to individual inquiries, produces several publications, and maintains the REHABDATA bibliographic database of disability and rehabilitation literature. Contact: NARIC, 8455 Colesville Rd., Suite 935, Silver Spring, MD 20910-3319. Telephone (800) 34-NARIC; (301) 588-9284 (Local and TDD).

Office of Special Education and Rehabilitation, Apple Computer, Inc.- This office supports Apple Computer's *National Special Education Alliance*. The Alliance Centers are community-based resources for parents, teachers, and people with disabilities. For a listing of Centers participating in the Alliance, contact the Center for Special Education Technology listed above. For additional information about the Alliance contact: National Special Education Alliance Center, Office of Special Education and Rehabilitation, Apple Computer, Inc., 20525 Mariani Ave., MS 43S, Cupertino, CA 95014. Telephone (408) 974-7910; (408) 974-7911 (TDD).

Rehabilitation Engineering Centers (RECs)- Sixteen Rehabilitation Centers are funded by the National Institute on Disability and Rehabilitation Research (NIDRR), U.S. Department of Education. Each Center has its own area of specialization. For a listing of these Centers, contact either the Center for Special Education Technology, or NARIC listings above.

OTHER NATIONAL INFORMATION SERVICE PROVIDERS

American Association for the Advancement of Science- 1333 H St., NW, Washington, DC 20005. Telephone (202) 326-6671.

American Speech-Language-Hearing Association (ASHA)- 10801 Rockville Pike, Rockville, MD 20852. Telephone (301) 897-5700 (Voice/TDD).

Association for the Advancement of Rehabilitation Technology (RESNA)- 1101 Connecticut Ave., NW., Suite 700, Washington, DC 20036. Telephone (202) 857-1199.

ERIC Clearinghouse on Handicapped and Gifted Children- The Council for Exceptional Children, 1920 Association Dr., Reston, VA 22091. Telephone (703) 620-3660.

ERIC Clearinghouse on Information Resources- Syracuse University, School of Education, 030 Huntington Hall, Syracuse, NY 13244-2340. Telephone (315) 443-3640.

Higher Education and Adult Training for people with Handicaps (HEATH Resource Center)- One Dupont Circle, Suite 800, Washington, DC 20036-1193. Telephone (Voice/TDD) (800) 544-3284 (Toll-free, except in the DC area); (202) 939-9320 (In DC area).

National Easter Seal Society- 70 East Lake St., Chicago, IL 60601. Telephone (800) 221-6827 (Toll-free, except in IL); (312) 726-6200 (In IL); (312) 762-4258 (TDD).

National Information Center on Deafness- Gallaudet University, Washington, DC 20002. Telephone (202) 651-5109 (Voice); (202) 651-5976 (TDD).

National Library Service for the Blind and Physically Handicapped- The Library of Congress, Washington, DC 20542. Telephone (202)707-5100.

National Technology Center- American Foundation for the Blind, 15 West 16th St., New York, NY 10011. Telephone (212) 620-2077.

Technical Assistance to Parent Programs (TAPP) Network- Federation for Children with Special Needs, 95 Berkeley St., Boston, MA 0211[illegible]. Telephone (617) 482-2915 (Voice/TDD); (800) 331-0688 (in MA).

COMPUTERIZED DATABASES

ABLEDATA- Funded by the National Institute for Disability and Rehabilitation Research (NIDRR) of the U.S. Department of Education, ABLEDATA is a computer-based information service that stores more than 15,000 commercially available products from over 1,800 manufacturers. Detailed information about these products are available to individuals, families, employers, agencies, students, or rehabilitation professionals. Contact: ABLEDATA, Adaptive Equipment Center, Newington Children's Hospital, 181 East Cedar St., Newington, CT 06111. Telephone (203) 667-5405, or by direct access from the Bibliographic Retrieval Services Information Technologies (BRS), (800) 345-4277.

Shared Communication and Assistance Network (SCAN)- SCAN is an electronic communication system which consists of Electronic Mail, Bulletin Boards, and Specialized Databases. This network provides University Affiliated Programs and other human services agencies and organizations with a wide variety of information and resources related to the special needs of individuals with developmental disabilities. SCAN is operated by the American Association of University Affiliated Programs (AAUAP). Contact: AAUAP, 8605 Cameron St., Suite 406, Silver Spring, MD 20910. Telephone (301) 588-8252.

SPECIALNET- SpecialNet is an electronic communication system which consists of Electronic Mail, Bulletin Boards, and Databases. This network provides parent and professional users with immediate access to a large, national network which provides information exchange, technical assistance, and resource sharing. Contact: SpecialNet, GTE Education Services, Inc., 2021 K St., NW, Suite 215, Washington, DC 20006. Telephone (202) 835-7300.

PRODUCT AVAILABILITY RESOURCES

Assistive Devices Information Network — Used Equipment Referral Service — This service allows individuals and organizations to sell equipment that has been outgrown or is no longer needed. Buyers can usually acquire used equipment at a considerable savings over the price of new equipment. There is no charge for this service, and products appropriate for any disability or age can be listed. Contact: Assistive Devices Information Network, University of Hospital School, University of Iowa, Iowa City, IA 52242. Telephone: (319) 356-0768; (800) 331-3027 (in IA).

Closing the Gap- P.O. Box 68, Henderson, MN 56044. Telephone (612) 248-3294.

LINC Resources, Inc.- 4820 Indianola Ave., Columbus, OH 43214. Telephone (614) 885-5599.

TRACE Research and Development Center on Communication Control and Computer Access for Handicapped Individuals- University of Wisconsin at Madison, Room S-151 Waisman Center, 1500 Highland Ave., Madison, WI 53705-2280. Telephone (608) 262-6966.

IBM/Special Needs Exchange- P.O. Box 18707, Washington, DC 20036. Telephone (703) 439-1492.

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TOYS, GAMES AND SWITCHES

National Lekotek Center- Lekotek is a national, not-for-profit center, with 53 centers across the nation. Each center provides support and resources for families of young children with disabilities (birth through 8 years). Lekotek Centers provide a variety of services including: loan of adaptive toys and equipment; instructional computer classes in adapted computer technology; reading materials; and referrals to community resources. Among the publications available through Lekotek are two newsletters (*Innotek News* and *National Lekotek News*), and other materials useful in adapting toys (e.g., *Adaptive Toy Plan Book*; *Play Guide for Disabled Children*; and *A Computer Software Guide*). Contact: National Lekotek Center, 2100 Ridge Ave., Evanston, IL 60204. Telephone (708) 328-0001.

Ablenet- 1081 10th Ave., SE, Minneapolis, MN 55414. Telephone (800) 322-0956; (612) 379-0956 (In MN).

Adaptive Communication Systems, Inc. (ACS)- P.O. Box 12440, Pittsburgh, PA 15231. Telephone (412) 264-2288.

Communication Aids for Children and Adults- Crestwood Company, P.O. Box 04606, Milwaukee, WI 53204-0606. Telephone (414) 461-9876.

Handicapped Children's Technical Services, Inc.- P.O. Box 7, Foster, RI 02825. Telephone (401) 478-3444.

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